

REMARKS

Claims 1-3, 6-10, 13 and 14 are pending in this application. Claims 4-5, 11-12 and 15 have been withdrawn from consideration due to the finality of the Restriction Requirement. For purposes of expedition, claims 1-3, 6-10 and 13-14 have been amended in several particulars for purposes of clarity and brevity in accordance with current Office policy, to further define Applicants' disclosed invention and to assist the Examiner to expedite compact prosecution of the instant application.

Claim 1 has been objected to because of an instance of informalities listed on page 2 of the Office Action. In response thereto, claim 1 has been amended to overcome the objection.

Claim 8 has been rejected under 35 U.S.C. §112, 1st ¶ for reasons stated on pages 2-3 of the Office Action. In response thereto, claim 8 has been amended to overcome the rejection.

Claims 1-3 have been rejected under 35 U.S.C. §102(e) as being anticipated by Yang, U.S. Patent Application Publication No. 2002/0197759 for reasons stated on page 2 of the Office Action (Paper No. 060402). In support of this rejection, the Examiner cites paragraph [0040] of Yang '759 for allegedly disclosing "an overlapped region". In response thereto, base claim 1 has been amended to distinguish over Yang '759 in order to overcome this rejection. For example, base claim 1 has been amended to define a method of manufacturing polycrystalline silicon thin film using a laser beam to crystallize an amorphous silicon thin film, comprising:

forming an amorphous silicon layer on a substrate;
 irradiating the amorphous silicon layer using a laser beam that passes through a mask such that polycrystalline silicon grains are laterally grown from a boundary between liquid and solid silicon during crystallization; and
 transversely moving the mask relative to the substrate by a translation distance such that the laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed so as to increase an average width of the polycrystalline silicon grains,
wherein a width of the overlapping region during crystallization corresponds to the translation distance, and is varied between 0.5 μm and 2 μm.

As discussed in paragraph [0009] of Applicants' specification, the problem as identified by Applicants relates to the deterioration of the mobility of an electric field by a scattering effect during charge transfer if an average width of the polycrystalline silicon grains is small. As a result, polycrystalline silicon grains having an average width of a certain size is important and is

required to obtain superior current characteristics. These problems are remedied by Applicants' sole recognition that, if a laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed, and a width of the overlapping region during crystallization is varied between 0.5 μm and 2 μm , the most effective width of polycrystalline silicon grains can be advantageously obtained.

In contrast to Applicants' base claim 1, as amended, Yang '759 discloses only a conventional sequential lateral solidification (SLC) crystallization method in which a substrate 38, as shown in FIG. 2, is typically moved numerous times such that crystallization is repeated at various locations so as to completely crystallize the substrate. FIGs. 7A-7C show how amorphous silicon film is being crystallized using a mask, as shown in FIG. 6, having different slit patterns.

However, there is **no** disclosure from Yang '759 nor is there any teaching or suggestion of the Applicants' claimed "transversely moving the mask relative to the substrate by a translation distance such that the laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed so as to increase an average width of the polycrystalline silicon grains," such that "a width of the overlapping region during crystallization corresponds to the translation distance, and is varied between 0.5 μm and 2 μm " as expressly defined in base claim 1.

The rule under 35 U.S.C. §102 is well settled that anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. In re Paulsen, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); In re Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Those elements must either be inherent or disclosed expressly and must be arranged as in the claim. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); Verdegall Bros., Inc. v. Union Oil Co., 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). In addition, the prior art reference must be enabling. Akzo N.V. v. U.S. International Trade Commission, 808 F.2d 1471, 1479, 1 USPQ2d 1241, 1245 (Fed. Cir. 1986), cert. denied, 482 U.S. 909 (1987). The corollary of that rule is that absence from the reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 230 USPQ2d 81 (Fed. Cir. 1986).

In the present situation, Yang '759 fails to disclose and suggest key features of Applicants' base claim 1 and its dependent claims 2-3. Therefore, Applicants respectfully request that the rejection of claims 1-3 be withdrawn.

Similarly, claims 1-3 and 13 have been rejected under 35 U.S.C. §102(b) as being anticipated by Jung, U.S. Patent Application Publication No. 2002/0182341 for reasons stated on page 3 of the Office Action (Paper No. 060402). Again, as previously discussed, base claim 1 has been amended, for purposes of expedition, to further how a laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed, and how a width of the overlapping region during crystallization is varied between 0.5 μm and 2 μm , so as to obtain the most effective width of polycrystalline silicon grains. Likewise, base claim 13 has also been amended to define similar features. As amended, Applicants believe that that rejection is now moot, since Yung '341 does not disclose or suggest these features.

Lastly, claims 6-10 and 13-14 have been rejected under 35 U.S.C. §103 as being unpatentable over Yang, U.S. Patent Application Publication No. 2002/0197759, as applied to claims 1 and 3 above, for reasons stated on pages 5-6 of the Office Action (Paper No. 060402). Again, for purposes of expedition, similarly to base claim 13, base claim 6 has also been amended to render the rejection moot. For example, base claim 6 has been amended to define a method of manufacturing polycrystalline silicon thin film using a laser beam to crystallize an amorphous silicon thin film, comprising:

"forming an amorphous silicon layer on a substrate; and
irradiating the amorphous silicon layer using a laser beam that passes through a mask such that polycrystalline silicon grains are laterally grown from a boundary between liquid and solid silicon, wherein the mask is provided with at least a light transmission region for passing a laser beam and a laser non-transmission region for blocking the laser beam, and the laser transmission region is wider than the laser non-transmission region by more than 1 μm ; and
transversely moving the mask relative to the substrate by a translation distance such that the laser beam is overlappingly irradiated at an overlapping region on the substrate where amorphous silicon and a part of already crystallized polycrystalline silicon are exposed."

For reasons discussed above, Yang '759 does not disclose or suggest these newly added features. Therefore, Applicants respectfully request that the rejection of claims 6-10 and 13-14 be withdrawn.

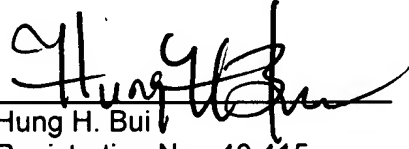
In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC office at (202) 216-9505 ext. 232.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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